



B & G ***FORCED HOT WATER HEAT***

BELL & GOSSETT COMPANY

Morton Grove, Illinois

SC-44

Even he knows there is no substitute for



Radiant Heat

70°

**INDOORS
REGARDLESS OF
THE WEATHER**



FORCED HOT WATER

THE FUNDAMENTALLY SUPERIOR HEATING SYSTEM

Judged by all standards of comfort and economy, the ideal heating system is the one which, after once bringing the building up to the desired temperature, *will automatically continue to furnish heat in amounts which at all times are equal to the heat loss.* As easy of achievement as this definition seems, it is only since the development of *Forced Circulation* Hot Water Heating that it has been fulfilled in satisfactory measure and at reasonable cost.

The spectacular and continuing growth of Forced Hot Water Heat cannot be credited to causes other than pure merit. Such a pronounced trend could not be sustained for so long a period by anything short of outstanding value. The many reasons why Forced Hot Water is the fundamentally superior heating medium are quickly revealed by an examination of its principles and operating equipment.

For ideal heating, the heat input must equal the heat loss

In general, any heating system can deliver the maximum amount of heat its design calls for. It is only when the heat requirement is small, as on a mild day, that the true efficiency of the system is shown. Unless the *heat input* can be controlled to match the *constantly varying heat loss*, then overheating, discomfort and fuel waste result.

Any of the presently employed heating media can approach ideal results by the use of sufficient equipment and controls, but the one which most nearly hits the mark with the least expenditure for equipment, operation and maintenance is clearly the most desirable.

How the B & G Forced Hot Water System meets the requirements of ideal heating

Water can be rapidly circulated mechanically at any temperature between its freezing and boiling points and therein is the secret of its adaptability to control. The practical temperature range commonly used today is between 90° and 215° in the radiators—a spread of 125°. This wide range permits accurate equalization of heat input and heat loss.

The operating equipment of a Forced Hot Water Heating System is extremely simple. An electrically driven circulating pump, a

flow control valve, a compression tank, a boiler relief valve and the proper electrical controls are the only units required.

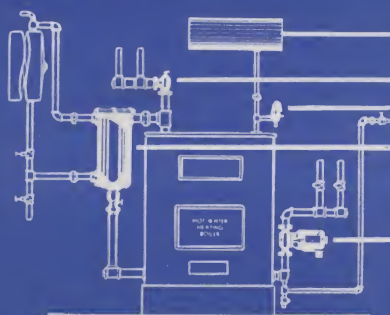
When the thermostat calls for heat, the pump and the burner start simultaneously. The pump rapidly circulates water through the system until the thermostat is satisfied, at which time both burner and pump stop.

On a mild day, because of the infrequent demands of the thermostat, the boiler water temperature may have dropped to a comparatively low degree. When the thermostat calls for heat, the pump starts circulating this low temperature water. Since the system itself is filled with water of even lower temperature, the average of the two is a very mild degree of heat. It is hot enough, however, to quickly supply the low B.T.U. requirement of the radiators on a mild day. The pump, therefore, stops before the water throughout the system reaches a high degree.



Air stratification occurs when heating systems have no "carry-over" of heat (left). This does not occur in the Forced Hot Water heated home because the residual warmth in the radiators between pump operating periods assures continuous currents of convected heat.

The comfort and economy of B & G Forced Hot Water Heating is achieved with this simple, fool-proof equipment—adaptable to any hot water heating boiler.



B & G
Booster



B & G
Flo-Control
Valve



**AVERAGE TEMPERATURE OF
WATER IN SYSTEM 96°**

146°

197°

In a building heated with a B & G Forced Circulation Hot Water Heating System, radiator temperatures increase or decrease to meet varying rates of heat loss. Never too much heat and never too little.

On days of severe cold, the operating periods of the pump and burner are longer, permitting the average temperature in the radiators to be built up to satisfy the heavier heat demand. All intermediate heat requirements are similarly handled in a smooth cycle of operation which eliminates both over and under heating.

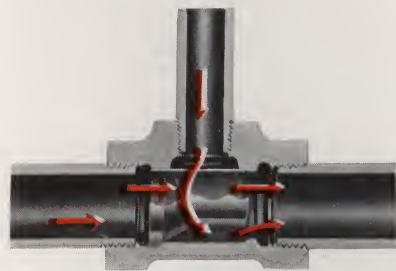
Adaptable to any kind of radiation

The B & G Forced Hot Water Heating System provides the same smoothly modulated, uniform heating, regardless of the kind of radiation employed. With either cast iron radiators, convectors, unit heaters or panels, the heat supply is accurately controlled to keep room temperature constantly at the desired degree.

Different types of heating units can be installed in the same building if the functions of various departments make it desirable. Observance of a few simple rules and proper zoning permit this, with the assurance that the heating problem has been solved in a manner which will give greatest satisfaction.

B & G Monoflo Fitting simplifies design . . . saves space, labor and materials

A forced hot water system can be installed with the conventional two-pipe layout, but the B & G Monoflo Fitting now makes possible a much simpler one-pipe system with many advantages. This expertly engineered fitting is used to connect the risers to a single main and diverts water into the heating units in the correct amounts for balanced heating.



The B & G Monoflo Fitting makes possible a space and money-saving single main piping system

The piping of a B & G Monoflo System is easier to conceal and obviously requires less material and less installing labor.

The following pages show the applications of B & G Forced Hot Water Heating. Simple equipment, greater fuel economy, adaptability to zoning and the superior control qualities of mechanically circulated water are the reasons this system is the ideal heating method for any type of building.

BEST FOR ANY KIND OF RADIATION

Cast iron radiators



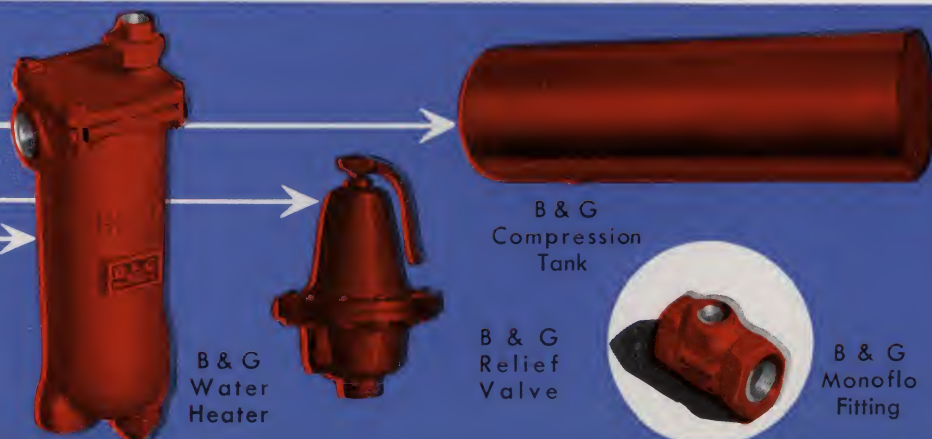
Convectors



Unit Heaters



Panel Heating



B & G FORCED HOT WATER HEAT



Automatically controlled, sun-like warmth . . . plus year 'round hot water for all household uses

Physical comfort can be described as absence of sensation. As applied to heating, this means that in the ideally heated home the occupants are not conscious of either warmth or chilliness.

B & G Forced Hot Water Heating, because of its ability to *automatically and continuously* balance the heat *input* with the heat loss, holds room temperature steadily at the comfort level.

This system is not an "all on"—"all off" method of heating. When the thermostat calls for heat, the pump circulates hot water through the system until the heat requirement is satisfied, and then stops. Radiators lose their heat gradually, however, because water cools slowly. This residual heat in the radiators prevents sharp fluctuations in room temperature.

The importance to health of uniform, even heat is well recognized . . . sudden and recurrent changes of temperatures in the home are a cordial invitation to colds.

The variable heat input of a B & G Forced Hot Water System obviously means greatest operating economy. Fuel is burned in amounts just sufficient to meet the heat demand, and none wasted in supplying excess heat. Authorities agree that the superior control qualities of mechanically circulated water make it the preferred medium for Radiant Panel Heating.

Year 'round hot water for kitchen, laundry and bath

One of the most desirable features of B & G Forced Hot Water Heating is a virtually limitless supply of hot water for household use. It is supplied automatically—24 hours a day—*winter and summer!*

A B & G Water Heater, connected to the *same boiler that heats the house*, is used to heat domestic water—no separately fired heater required. During the winter, only a small fraction of the heat generated is expended in heating the water. Summer operation is also amazingly low in cost. (See explanation below.)

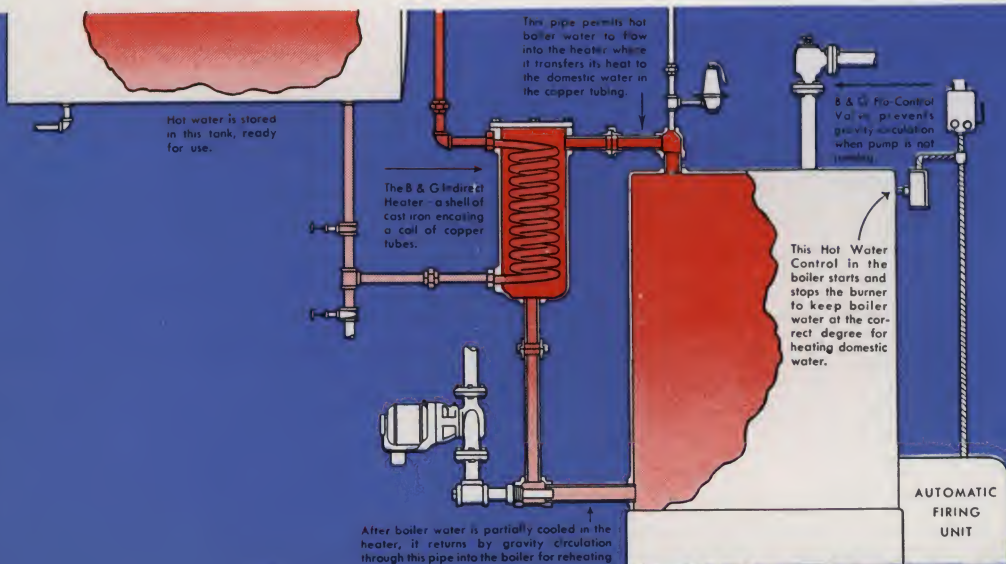


B & G Forced Hot Water Heat is not expensive. This cottage is one of several hundred in a low cost housing development, all equipped with B & G Systems.

Healthful draftless warmth

Plenty of hot water

Lower fuel bills



Operation of B & G Water Heater

This diagram shows how the house heating boiler is used to heat the domestic water in summer. The Hot Water Temperature Control in the boiler keeps boiler water at a temperature sufficient to heat the water for household use, but since in warm weather there is no call for heat, the Booster does not run. Consequently, the Flo-Control Valve in the supply main stays tightly closed and no heated water can circulate by gravity into the radiators. Only a few short daily operations of the burner or stoker keep the boiler water at the proper degree for heating the tap water.



B & G FORCED HOT WATER HEAT

*For
Apartments*

Amazing operating economy and greater tenant comfort have swung apartment houses to B & G Forced Hot Water Heat

With *forced circulation* there is virtually no limit to the height or area of hot water installations. From a start in small residential installations, Forced Hot Water Heat has spread rapidly to apartments, schools, churches, office buildings and factories.

The Ida B. Wells Housing Project in Chicago, for example, with 1669 apartments and a population of about 8000 people, is heated with a B & G Monoflo *single main* Forced Hot Water System. This mammoth installation has 254,000 sq. ft. of radiation, supplied from a central plant through a supply line one-half mile in length.

Easily zoned for greater comfort and economy

While the B & G Forced Hot Water System is basically more economical to operate because of controlled heat flow, *zoning* adds further to fuel saving and greatly improves tenant comfort. By dividing the piping system into separate zones for individual apartments, each tenant has absolute command of his own heating. He can keep his apartment as warm or cool as he likes without affecting the comfort of other building occupants.

By zoning, full compensation can be achieved for the effect of sun, wind and building height. It makes it unnecessary to overheat apartments on the leeward side in order to supply sufficient heat to those on the windward side.

Simplicity of operation means dependability and low maintenance



Apartment houses can be more economically heated with B & G Forced Hot Water Heating Systems.

Simplicity of the heating system is vital to low maintenance cost. In the B & G Forced Hot Water Heating System there is no complex equipment. In fact, the only moving unit is the electrically operated Booster pump. This pump, through years of actual field operation, has been developed into as fool-proof a unit as any mechanical device could be, requiring only an occasional oiling to keep it in operating condition. It uses little current and is altogether dependable.



75°



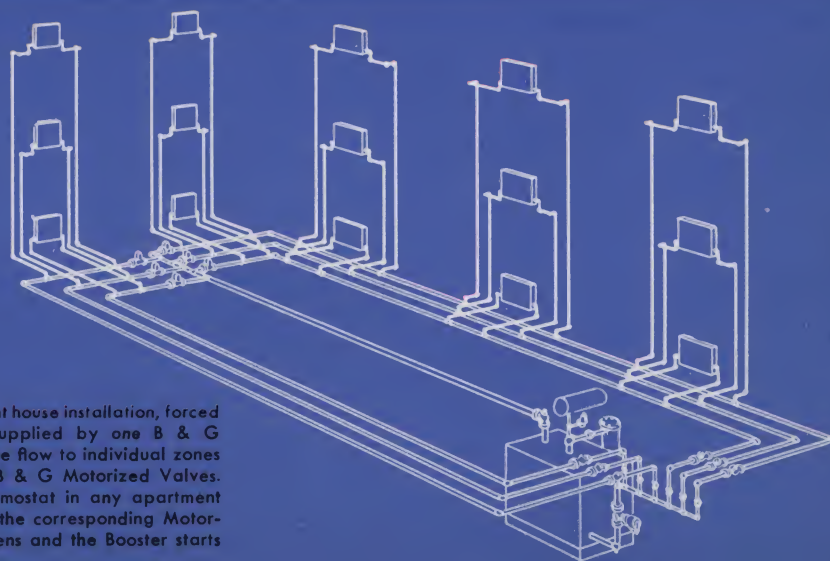
72°



60°

B & G Motorized Valve for zone control

B & G Motorized Valves are frequently used to control individual zones, as shown in diagram at right. As an alternative, a thermostatically controlled B & G Booster Pump can be installed in each zone circuit.



In this apartment house installation, forced circulation is supplied by one B & G Booster, with the flow to individual zones controlled by B & G Motorized Valves. When the thermostat in any apartment calls for heat, the corresponding Motorized Valve opens and the Booster starts simultaneously.

For the Modern Industrial Plant



Greater comfort for employes on less fuel

Workers' efficiency in a large measure depends on physical comfort. Too little heat or stuffy overheating are both reflected in a lowered quality and volume of work. Employers, therefore, are paying increasing attention to better methods of controlling the heat supply.

The same zoning practices which apply to residential applications of B & G Forced Hot Water can be employed with equally satisfactory results in industrial plants. The merits of zoning a factory are evident when it is considered that the office can be kept at 72°, the shop at 65°, and storage rooms at 50°. Under these conditions, employee comfort is at a maximum and fuel consumption held to rock bottom. Heat is delivered in accordance with the functions of each department and the workers' needs.

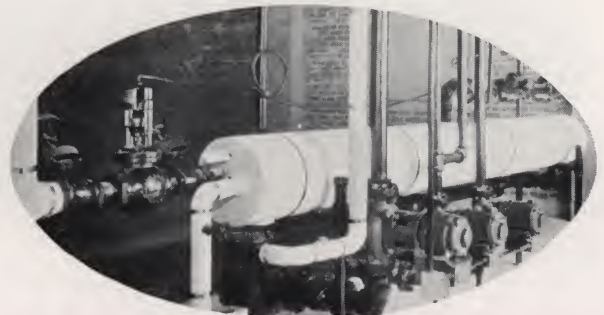
Faster, easier designing

The B & G Forced Hot Water Heating System is as flexible in design as in control. Mains and branches can be run uphill and downhill, the boiler can be above or below the system and radiators at remote points effectively circulated even when below the main. Errors in sizing and layout which might be fatal to a gravity flow installation are taken in stride by the forced circulation system.

Designing time is materially shortened because of simplified methods. Various charts and tables are available which eliminate complex calculations on pump and pipe sizes. Complete design and installation data is given in the B & G Handbook—send for your copy.

Adaptable to plants with steam boilers

Water for the heating system can be heated in a steam convertor and pumped through the system as required. The steam convertor shown here is one of five which supply hot water to fourteen heating zones in a modern hospital.



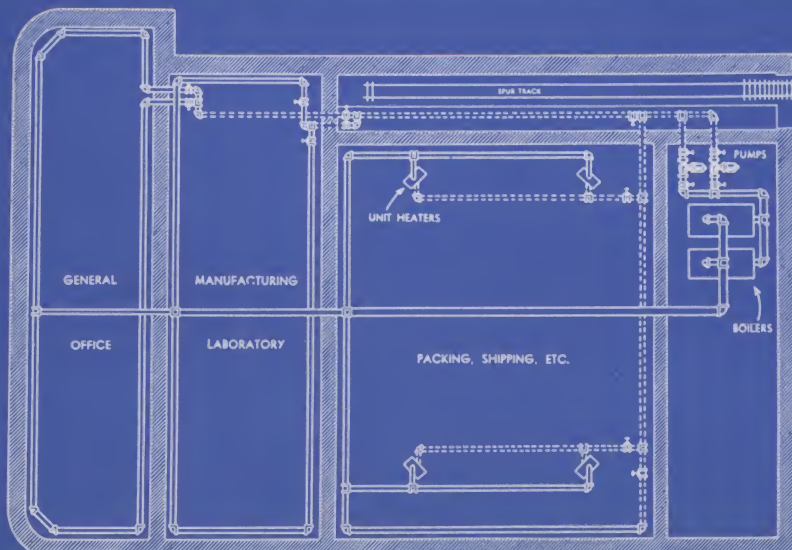
OFFICE
72°



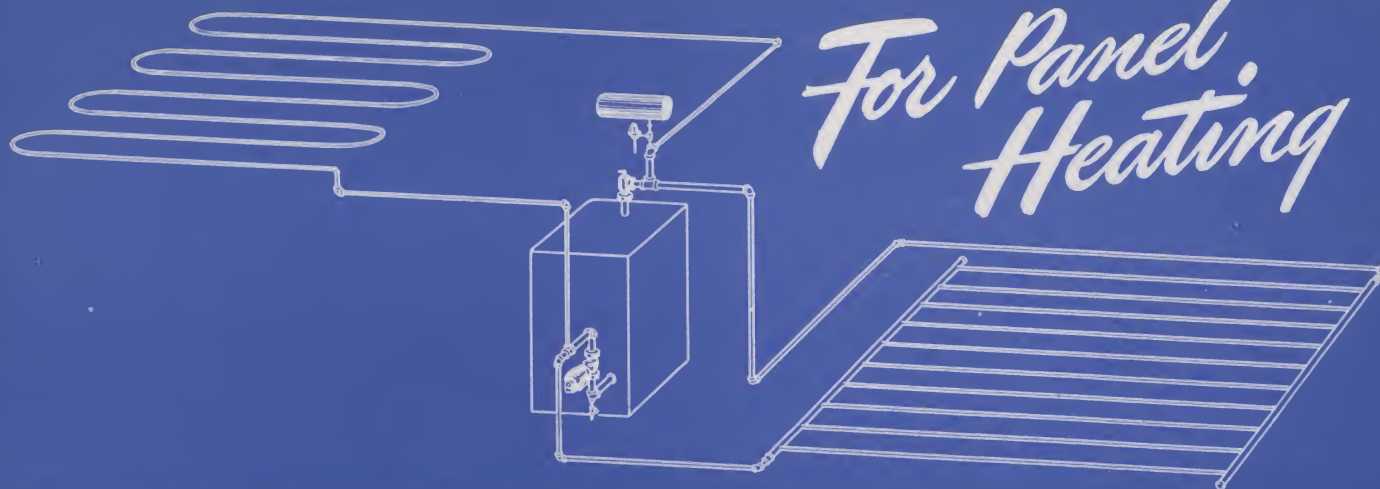
MACHINE SHOP
65°



WELDING SHOP
60°



This actual factory piping plan is a typical example of zoning to fit the needs of various departments. The installation is a single main B & G Monoflo System, with the exception of the circuit supplying the unit heaters, which is a two-pipe reverse return circuit.



*For Panel.
Heating*

Radiant Heating offers three outstanding advantages

There is little question but that Panel or Radiant heating has created widespread interest and is rapidly growing in importance. Radiant heating establishes comfort conditions by limiting the heat loss of the body by radiation and convection.

In conventional heating systems, the heat loss from the body is compensated for by maintaining an air temperature high enough to create comfort conditions. Heat loss to the air, however, is only one of several ways in which the human body dissipates its excess heat. A considerable quantity is lost by radiation of heat rays from the body which are absorbed by cold walls or other surfaces in the room. *By reducing the amount of heat lost in this manner, it is possible to maintain comfort at lower air temperatures!*

Radiant heating surfaces are obtained by burying pipe coils in the floor or installing them in the ceiling. Where sufficient radiating surface cannot be obtained in either of these locations, supplementary panels may be installed in the walls.

The advantages of Radiant heating can be classed as architectural, physiological and economic. Radiant heating panels eliminate all evidence of heating—no radiators—no grills. They do not create concentrations of convected heat currents, which tend to raise dust and soil walls and drapes. From a physiological standpoint, Radiant heating creates a greater sense of comfort, because of more uniform air and radiant temperatures. It contributes to health because of smaller differential between outdoor and indoor temperatures and absence of drafts. Economically, the evidence of existing systems points to materially lowered fuel consumption.

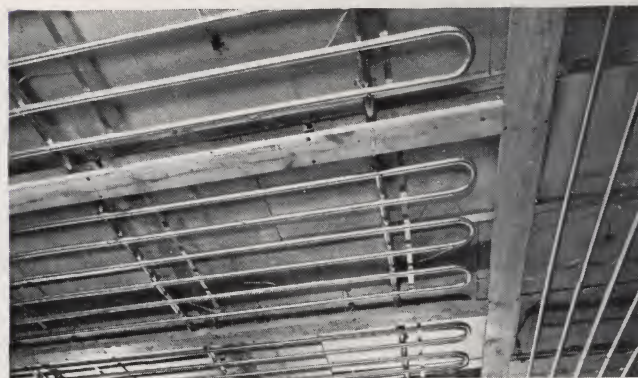
Forced Hot Water the choice for Radiant Heating

It is the consensus that Forced Hot Water has all the qualifications which lead to most effective application of Radiant heating. Its simple, trouble-free equipment provides the smooth and accurate control of heating medium temperature so necessary to this type of system. It does not require an elevation differential between the boiler and the radiating surfaces. It is the corrosion-proof system, because the pipes are always completely filled with water.

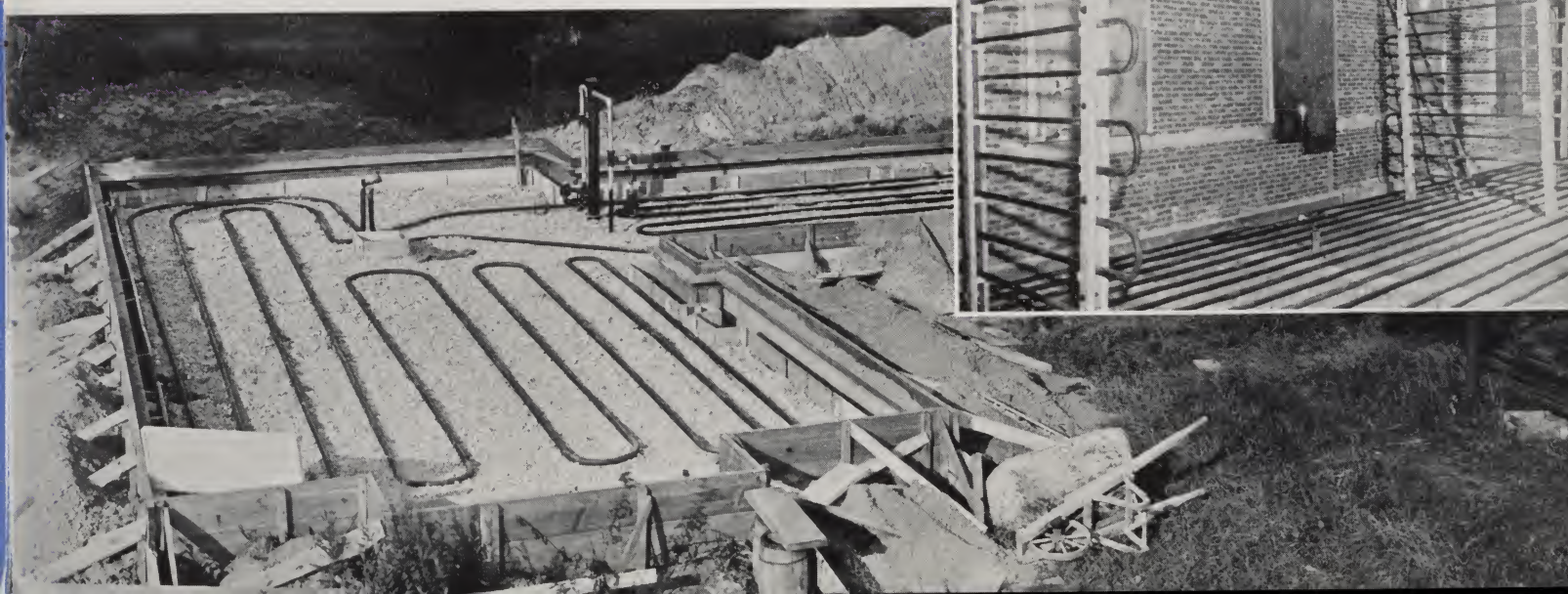
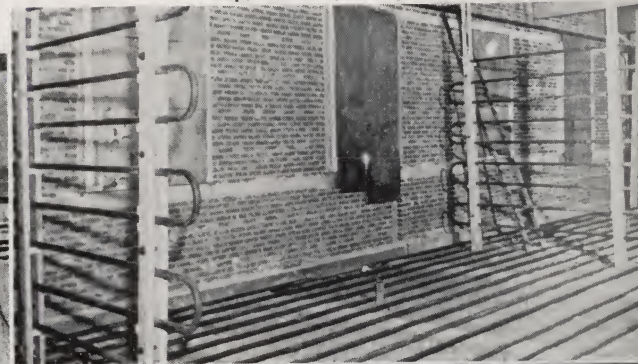
Floor panels—grid design



Ceiling panels—serpentine design



Supplementary wall panels



OTHER
B & G
PRODUCTS

WATER HEATERS

**... for Home
and Industry**

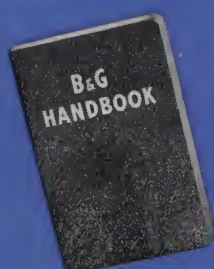


The indirect method of heating water for household use or for industrial process work has amply demonstrated its efficiency by its ability to produce large volumes of hot water at very low cost.

B & G Water Heaters utilize hot water or steam from the heating boiler to heat the service water. Suitable controls permit operation in summer as well as in winter. A separately fired heater is thus eliminated and full advantage taken of the usually

greater efficiency of the larger heating boiler.

B & G Water Heaters are made in a comprehensive range of designs and capacities which cover every water heating requirement—from supplying the needs of a cottage to those of a swimming pool. They are available for operation either with or without a storage tank. Complete information is given in B & G Catalogs which will be sent to you upon request.



For complete design and installation data on B & G Forced Hot Water Heating Systems and Service Water Heating Systems, send for the B & G Handbook.

BELL & GOSSETT CO. MORTON GROVE, ILLINOIS

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